**Introduction**

- Hamstring muscle belly injuries are some of the most common injuries in athletes (29%) with high re-injury risk (12-31%).
- Increased risk in sports requiring rapid acceleration.
- NFL speed positions (WR, DB, RB) have significantly higher rates of HS muscle strains.
- PRP Tx for HS in NFL:
  - 12 players w/ acute HS injuries tx w ACP (low WBC, 3x plts), 2-3 injections 1 wk apart
  - Results: RTP 3 days earlier, overall 1 game difference, 0 recurrences (usually 2-4/year)
  2. Rettig AC et al, OJSM 2013
  - 10 players w/ acute HS injuries tx w PRP (high WBC, 9.3x plts, plus bicarb & ACD-A)
  - Results: No difference vs. rehab alone

**Purpose:** To evaluate RTP in NFL players w/ acute HS injuries after ACP & compare to players w/o ACP.

**Hypothesis:** NFL players w/ acute HS injuries will have earlier RTP vs. those who do not receive ACP.

---

**Results**

**Missed Time: ACP vs. No ACP in NFL HS Injuries**

<table>
<thead>
<tr>
<th>Time Missed</th>
<th>+ ACP</th>
<th>- ACP</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Days</td>
<td>22.5 ± 20.1</td>
<td>25.7 ± 20.6</td>
<td>0.81</td>
</tr>
<tr>
<td>Practices</td>
<td>18.2 ± 9.2</td>
<td>22.8 ± 11.9</td>
<td>0.68</td>
</tr>
<tr>
<td>Games*</td>
<td>1.3 ± 0.47</td>
<td>2.9 ± 1.1</td>
<td>&lt; 0.05*</td>
</tr>
</tbody>
</table>

**ACP injections for acute HS injuries in NFL players allows for faster RTP vs non-ACP group (1 game difference)**

---

**Methods**

**Inclusion Criteria:**
- 1 profession NFL team
- 10 years (2009-2018)
- All acute HS injuries
- All MRI’s graded by same MSK radiologist
- Grade 2 injuries
  - >75% cross section
  - 10-15 cm long
  - Perimuscular edema
  - No retraction/cyst

**Injection protocol:**
- ACP injections given within 24-48 hours after injury (Grade 2 only)
  - 10ml venous blood, pH 5
  - Centrifuge 1500 RPM for 5 mins
  - Low WBC, 3x plts
  - 2-3 injections 1 wk apart
  - Given by senior author

**Outcomes:**
- Days, practices, & games missed
- Compared NFL players w/ ACP to those who did not receive ACP

**Player Profiles**

- + ACP
  - Avg age: 28.8 y/o
  - LB>WR>CB
  - LH biceps most common
  - Bilateral → 1
  - Recurrences → 1
- - ACP
  - Avg age: 25.7 y/o
  - WR>LB>RB
  - LH biceps most common
  - Bilateral → 3
  - Recurrences → 1

---

**Conclusions**

- ACP injections for acute HS injuries in NFL players allow for faster RTP vs non-ACP:
  - Fewer days & practices missed w/ ACP but not stat sig
  - 1 NFL game faster RTP w/ ACP injections
- 1 recurrence - earlier RTP due to playoff game
- 1 game in the NFL is a big deal!
  - HS strains can cause prolonged absence & high recurrence rates
- Recommend PRP w/ low WBC & low platelets (ACP) for HS
  - Avoid high WBCs & high platelet PRP in HS
    - That is better for tendinopathy

**Further studies**
- GPS (catapult) data now being used for RTP

---

**References**

3. Rettig AC et al, OJSM 2013

---

**Corresponding Author**

James P. Bradley, M.D.
Burke and Bradley Orthopedics
University of Pittsburgh Medical Center
<br>bradleyjp@upmc.edu

---

**Acknowledgements**

The authors would like to thank UPMC Radiologist Jeff Towers, MD as well as John Norwig, ATC and Sonia Ruef, ATC with the Pittsburgh Steelers for their assistance.